T 2 Sampling of Aggregates

1. According to this FOP, which of the following statements is true?
   a. Field samples taken in-place from the roadway shall consist of multiple increments.
   b. If the portion obtained by sampling accurately represents the material being obtained, any analysis of that portion is inappropriate for the project at hand.
   c. Maximum size is one sieve larger than the first sieve to retain more than 10 percent based on cumulative percent retained.
   d. Sampling of stockpiles is always the preferred method because of the representative nature of such large quantities of material.
   e. None of the above.

2. When sampling from the conveyor belt, which method requires stopping the belt?
   a. Method A.
   b. Method B.
   c. Both Methods A & B.
   d. Neither Method A nor B.

3. When sampling from the belt discharge (Method B), pass the sampling device twice through the material perpendicular to the stream attempting to exactly fill it.
   a. True
   b. False

T 248 Reducing Field Samples of Aggregates to Testing Size

4. According to this FOP, which of the following statements is **incorrect**?
   a. Samples consisting of mixtures of coarse and fine aggregate may be reduced only by Method A (Mechanical Splitter).
   b. Samples of coarse aggregate wetter than SSD shall not be reduced by Method B (Quartering).
   c. Method A (mechanical splitter) is the preferred method for reducing any aggregate sample to testing size regardless of moisture content.
   d. When using Method B (Quartering) the mass of the two final sample quarters must agree within five percent.
   e. All of the above.

5. According to this FOP, which method should be used to reduce wet fine aggregate to testing size?
   a. Method A (Mechanical Splitter)
   b. Method B (Quartering)
   c. Method C (Small Stockpile)
   d. b & c

e. All of the above.

6. When quartering per Method B turn the material over at least four times either with a shovel or by rolling the sample by pulling a corner of the blanket diagonally across the sample. After turning and forming into a conical pile, flatten the pile such that the height is four to eight times the diameter.
   a. True
   b. False

T 255 Total Moisture Content of Aggregate by Drying

7. According to this FOP, constant mass has been achieved when…
   a. there is less than 0.10% loss in mass after thirty minutes of additional drying in an oven maintained at 230±9º F.
   b. there is not more than 0.10% loss in mass after thirty minutes of additional drying in an oven maintained at 230±9º F.
   c. the sample has been air-dried overnight.
   d. None of the above.

8. According to this FOP, alternate heat sources may be used when…
   a. "uncontrolled" drying at higher temperature will not alter the aggregate.
   b. approved by the agency.
   c. the aggregate will not be used in further tests.
   d. All of the above.

9. Given the following masses for a sample of material, what is the reported moisture content?

$$\frac{M_W - M_D}{M_D} \times 100$$

Empty container mass	583.3 g
Initial moist mass (container + sample)	3946.3 g
Final dry mass (container + sample)	3814.2 g

   a. 3.5%
   b. 3.9%
   c. 4.1%
   d. 4.2%
   e. None of the above.

T 27/T 11 Sieve Analysis of Fine and Coarse Aggregates
Materials Finer Than No. 200 in Mineral Aggregate by Washing

10. According to this FOP, which of the following statements regarding sample sieving is true?
    a. Sieving duration must be at least ten minutes to assure complete separation.
    b. After shaking in a mechanical shaker for a period of time, evaluation of "complete separation" is performed by hand-sieving the material retained on each individual sieve.
    c. The shaking duration is adequate provided that not more than 0.5 percent by mass of the total sample passes any given sieve after one minute of continuous hand sieving.
    d. a & c
    e. b & c

Calculations

11. - 12. Gradation Calculations (Use information below and on the following page)

Perform the calculations requested in the following questions where…

Dry mass of total sample before washing: 3525.9 g

Dry mass of sample after washing: 3152.8 g

Amount of No. 200 minus washed out: _____

11. The calculated value for cumulative percent retained on the 3/8" sieve was _____. Is the gradation on the coarse screens valid when evaluated for unexplained change in sample mass (Yes/No)? If the coarse gradation is not valid, why is this the case?
    a. 11.4 - - Yes
    b. 88.6 - - No _____
    c. 18 - - Yes
    d. 17.9 - - No _____
    e. 82.1 - - Yes

12. The final reported percent passing the No. 80 sieve was _____. Is the gradation on the fine screens valid when evaluated for unexplained change in sample mass (Yes/No)? If the fine gradation is not valid, why is this the case?
    a. 79.0 - - No _____
    b. 21.6 - - Yes
    c. 22 - - No _____
    d. 79 - - Yes
    e. 54 - - No _____

13. The sieve analysis method used for the gradation on this test was _____ (A, B, C).

Gradation on Coarse Screens

Sieve Size in.	Mass Retained g	Percent Retained	Percent Passing	Cumulative Mass Retained g	Cumulative Percent Retained	Percent Passing
1½	0			0		
3/4	22.9			22.9		
5/8	44.3			67.2		
1/2	161.8			229.0		
3/8	400.6			629.6		
No.4	505.8			1135.4		
Pan	**2001.8**					

The material passing the No.4 sieve was split to a mass of 522.4 g. This material was then sieved with results as shown below.

Gradation on Fine Screens

Sieve Size in.	Mass Retained (g)	Percent Retained	Percent Passing	Cumulative Mass Retained (g)	Cumulative Percent Retained	Percent Passing
No.4	0			0		
No.10	103.8			103.8		
No.40	197.4			301.2		
No.80	124.2			425.4		
No.200	80.9			506.3		
Pan	12.6					

Final Gradation on All Screens "BY INDIVIDUAL MASS RETAINED"

Sieve Size in.	Individual Mass Retained g	Adjusted Individual Mass Retained g	Percent Retained	Percent Passing
1½				
3/4				
5/8				
1/2				
3/8				
No.4				
No.10				
No.40				
No.80				
No.200				

Final Gradation on All Screens "BY CUMULATIVE MASS RETAINED"

Sieve Size in.	Cumulative Mass Retained g	Adjusted Cumulative Mass Retained g	Cumulative Percent Retained	Percent Passing
1½				
3/4				
5/8				
1/2				
3/8				
No.4				
No.10				
No.40				
No.80				
No.200				

TP 61 Determining the Percentage of Fracture in Coarse Aggregate

14. According to this FOP, which of the following statements is true?
    a. Percent fracture may be calculated based on particle count or mass.
    b. When the specifications list only a total fracture percentage, the sample shall be prepared according to Method 2 (Individual Sieve Fracture Determination).
    c. This procedure covers the determination of the percentage by mass of fine aggregate that consists of fractured particles meeting the specified requirements in accordance with AASHTO TP 61.
    d. All of the above.
    e. None of the above.

15. A fracture test was performed according to Method 1 (Combined Fracture Determination) with the following results:

    Mass of fractured particles (F): 942.2 g
    Mass of unfractured particles (N): 203.8 g
    Mass of questionable particles (Q): 202.2 g

$$P = \frac{\left(\frac{Q}{2} + F\right)}{(F + Q + N)} \times 100$$

    The reported fracture was _____. Is this result valid according to the rules established by this FOP? (Yes/No). If the result is not valid, why?

    a. 77.4% - - No _____
    b. 77% - - Yes
    c. 69.9% - - No _____
    d. 70% - - Yes
    e. None of the above.

T 176 Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test

16. According to this FOP, use of tap water for the working solution is never allowed.
    a. True
    b. False

17. How many shaking cycles are required when using the Hand Method?
    a. 100 cycles in one minute
    b. 90 cycles in approximately 30 seconds.
    c. 45 cycles in one minute
    d. None of the above.

18. When performing a sand equivalent test consisting of only one cylinder (one determination), if a clear line of demarcation (clay reading) appears at 29 minutes, is it permissible to record the reading at that time?
    a. Yes, record the clay reading and proceed with the sand reading.
    b. No, wait for thirty minutes to elapse, record the clay reading, and proceed with the sand reading.
    c. No, retest using three cylinders and use the shortest sedimentation period of the three to determine the Sand Equivalent.
    d. Any of the above is correct.

19. For a clay reading of 14.1 and a sand reading of 1.1, what is the reported SE value?
    a. 7
    b. 7.8
    c. 8
    d. 12.8
    e. 13

$$SE = \frac{\text{Sand Reading}}{\text{Clay Reading}} \times 100$$